

## Marine Careers

### Sea Urchins - *Diadema antillarum*



Sea Urchins by Jacqui Stanley 2010

#### Activity Summary

In this lesson, students will learn about the role of sea urchins in the coral reef environment. Sea urchins have a spherical-shaped body, and students will discuss how the shape of this creature lends itself to the function as they use paint or other art media to create their interpretation of a long-spined urchin.

Grade Level: 3 – 6

Time Frame: One class period

#### Materials:

##### Painting:

- Paper suitable for painting or crayons
- Poster paints and brushes
- Crayons/pencils

##### Collage:

Pictures of sea urchins from magazines  
Construction paper and glue  
Found objects such as pieces of fabric, buttons, hair ribbon, bamboo skewers  
painted black, old tennis balls or round objects  
Color Wheel – used to discuss values of black and white

### **Learning Objectives:**

Art:

Students will be able to:

- Create artworks, using a variety of colors, forms and lines
- Identify colors, textures, forms, and subjects in the environment
- Identify connections between the visual arts and other disciplines in the curriculum

Science:

Students will be able to:

- Communicate observations and provide reasons for explanations
- Use form to explain function
- Use function to explain form

### **Vocabulary**

ART

BALANCE - a design principle concerned with the arrangement of one or more elements in a work of art so that they appear symmetrical (even) or asymmetrical (uneven) in design and proportion

PATTERN - Artists create pattern by repeating a line, shape or color over and over again. Sometimes a regular repetitive pattern will suggest movement.

TEXTURE – how something feels.

VALUE – the lightness or darkness of a color

SHADES - the dark values of a color – created by mixing different amounts of black

TINTS – the light values of a color – created by mixing different amounts of white

SCIENCE

SEA URCHIN – has a spherical or round body with long protective spines.

ARISTOTLE'S LANTERN – the mouth of the sea urchin. It is an arrangement of five teeth and is used to scrape food from hard surfaces.

SPINES – the long spines are used for protection and may puncture human skin.

The tip of each spine has a small hook, like a fishing hook and that makes these spines difficult to remove.

## Preparation

Projected image of sea urchin – see start of lesson plan

Images from internet showing different species of sea urchins

## Procedure

- 1) Discuss the role of the sea urchin. Why do students think it might be important in the reef environment.
- 2) Look at parts of the urchin. The long-spined sea urchin is most commonly found in Florida, but there are many other sea urchins in all shapes and colors. For example, some sea urchins use their tube feet to pick up small rocks, bits of shell, or seaweed. The animals arrange these objects so that they cover their bodies. By doing this, a sea urchin can blend in with its surroundings. This is a form of camouflage. It helps the sea urchin hide from enemies.
- 3) Decide on a background. If students are painting, the background could be a section of rock on the reef where they inhabit crevices to help with camouflage. If students are creating a collage, the background can be any media that will allow the sea urchin to stand out.
- 4) This creature is challenging to paint or create as it is mostly all black.
- 5) Students need to consider the importance of **value** in their art.
- 6) Value will allow the long spines of the urchins to stand out individually and give the image **texture**.
- 7) Once the background has been created, draw or paint or create a sphere. The mouth of the sea urchin is at the bottom, so it will not be easily seen.
- 8) Each spine begins from inside the shell plates. The bottom of each spine will be wider and may even be a slightly different color than the sharp, pointy spines at the top.
- 9) You will need black and white paint, if you are creating a painting. If you are making a collage, you can cut strips of black and white construction paper or newsprint or any other paper media or found media that will work.
- 10) Begin your spines from the outside edge of the sphere. They don't all have to go in the same direction. The sea urchin can maneuver the spines by pumping water through its body, so the spines can be pointing in several different directions.
- 11) Now build the urchin by laying out spines starting at the outside and moving in, towards the centre.

- 12) Because this animal is usually all black, you need to be thinking about the value of the choices you are making. You can alternate the values of the spines – make two spines black, two or three spines, grayish and even one or two spines white. The sea urchin usually has all black spines, but some are white and the juvenile sea urchins have banded black and white spines.
- 13) Create some groups of sea urchins in a habitat where you think they will survive well.
- 14) Share your urchins with the class!

### Education Standards

<b>National Education Standards</b>	<p><a href="#">ART : NA-VA.K-4.1</a> UNDERSTANDING AND APPLYING MEDIA, TECHNIQUES, AND PROCESSES</p> <p><a href="#">NA-VA.K-4.2</a> USING KNOWLEDGE OF STRUCTURES AND FUNCTIONS</p> <p><b>SCIENCE: E.U.5</b> Form and function</p> <p>a. Form–Form is the shape of an object. The goal is for students to use form to explain function.</p> <p>b. Function–Function is the normal or characteristic action of anything. The goal is for students to use function to explain form.</p> <p><b>ENGLISH/LANGUAGE ARTS</b> <b>NCTE/IRA Standards</b></p> <p>3) Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate effectively with a variety of audiences and for different purposes.</p> <p>11) Students participate as knowledgeable, reflective, creative, and critical members of a variety of literacy communities.</p>
<b>Ocean Literacy Principles</b>	The Ocean supports a great diversity of life and ecosystems

### Evaluation

Students create a group of sea urchins in a suitable habitat showing student used texture, value and line.

### Extension

Students research why the sea urchin's mouth is called "Aristotle's Lantern" and present a short explanation to the class with a diagram.

### Resources

[https://marinelife.noaa.gov/media lib/search.aspx?act=ret](https://marinelife.noaa.gov/media_lib/search.aspx?act=ret)

This site is a library of images of sea urchins from the National Marine Sanctuaries.

<http://askabiologist.asu.edu/aristotles-lantern>

This web site has a diagram and explains why the mouth of the sea urchin is called Aristotle's Lantern"

### **Acknowledgements:**

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